

**Sub: Physics 1st paper (Creative)**

Sub Code : 

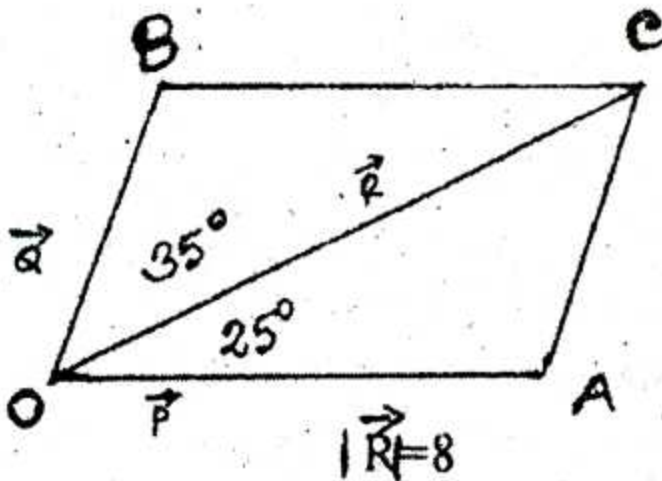
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**Time: 2 Hrs 10 min**

**Full marks: 40**

**[Answer any four questions.]**

1. ▶

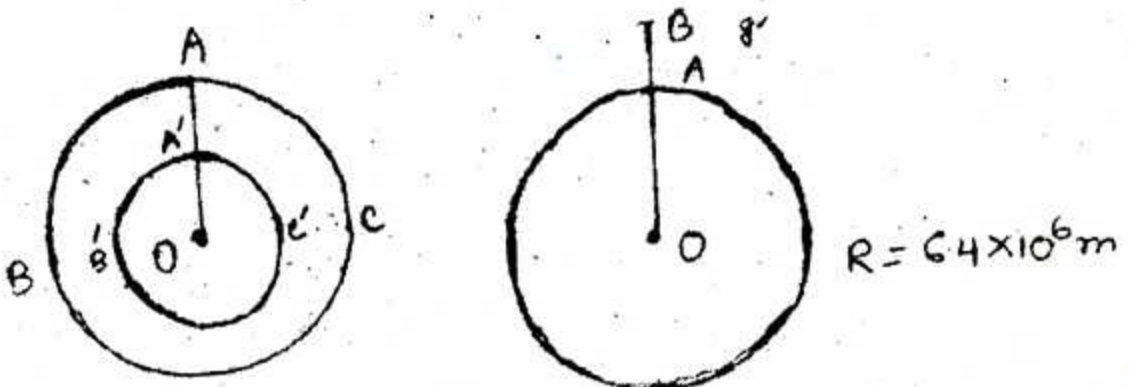


- a. What is law of polygon? 1
- b. How can a bird fly by obeying the addition rule of vectors? 2
- c. From the stem, what is the magnitude of  $\vec{P}$  and  $\vec{Q}$ ? 3
- d. If  $\vec{P} = \vec{Q}$ , Then what will be the situation of angle of resultant? 4

2. ▶ From the top of a building 1.6m high, a ball is projected horizontally. The line joining the point of projection to the point where it hits the ground makes an angle of  $45^\circ$ . With the horizontal.

- a. What is couple? 1
- b. Show that angle of repose is equal to angle of friction. 2
- c. After how long does it strike the ground? 3
- d. Draw the figure and answer that what is the initial velocity of the ball? 4

3. ▶



- a. What is conservative force? 1
- b. Why frictional force is not a conservative force? 2

- c. From fig-2 if  $g' = 60\% g$ , then what will be AB? 3
- d. In fig-1, What will be the change of value of  $g$  from point A to O? 4

4. ► A particle of mass 10 kg is suspended by a wire of area of cross section  $0.1 \text{ cm}^2$ . In this condition length will be 6.5925 m. If you take away the particle then length of the wire will be 6.59 m.

a. What is viscosity? 1

b. In case of Poisson's ratio, How can you get,  $\sigma = -\frac{L\Delta r}{r\Delta L}$ ? 2

c. What is the Young's modulus of the wire? 3

d. If you increase the length of the wire by 1 mm then how much mass you have to add? 4

5. ► The length of the pendulum P is twice of the length of the pendulum Q. In the place A the length of a second pendulum is 1m but in the place B its length is 0.8m.

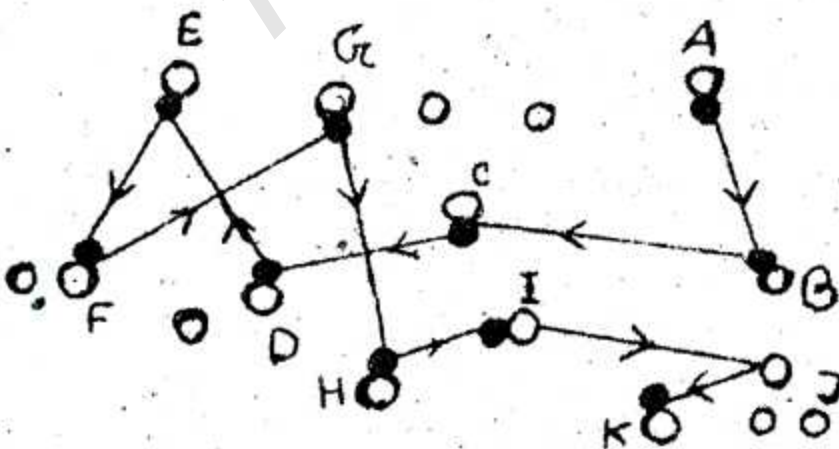
a. What is simple harmonic motion? 1

b. If you take the pendulum clock in different places then why does it changes its time? 2

c. If the time of pendulum Q is 3 sec, then what will be the time period of the pendulum P? 3

d. If you take the pendulum from the place B to A, then what will be the ratio of their weight. 4

6. ►



a. What is hygrometry? 1

b. What do you understand by 65% relative humidity at a place? 2

c. What is the mean free path of molecules? 3

d. What is the relation of average distance and density between two molecules? 4

# Model Question of HSC Examination 2017 (All Board)

## Sub – Physics (MCQ)

Sub Code : 174

Time : 35 Minutes

Full Marks : 35

[ N.B. Fill the circle of the correct answer with a black ball point pen. Each question bears 1 mark. ]

1. What is the horizontal distance covered by a Projectile?
    - (a)  $R = \frac{V_0^2 \sin \theta_0}{2g}$
    - (b)  $R = \frac{V_0^2 \sin 2\theta_0}{g}$
    - (c)  $R = \frac{V_0 \sin \theta_0}{g}$
    - (d)  $R = \frac{2V_0 \sin \theta_0}{g}$
  2. The position vector of a particle at time  $t$  is  $\vec{r} = t^2 \hat{i} + tk \hat{k}$ . Calculate the instantaneous acceleration at the particle at  $t = 2s$ .
    - (a)  $12 \hat{i} + 4 \hat{j} + k$
    - (b)  $4 \hat{i} + 12 \hat{j} + k$
    - (c)  $12 \hat{i} + 2 \hat{j}$
    - (d)  $2 \hat{i} + 6 \hat{j}$
  3. For angular velocity—
    - i. The Unit of angular velocity is  $\text{rads}^{-1}$
    - ii. Angular velocity  $\omega = \frac{\theta}{t}$
    - iii. A car has Linear acceleration when it goes to velocity

Which one of the following is correct?

    - (a) i & ii
    - (b) ii
    - (c) iii
    - (d) ii & iii
  4. Tug of war is an example of—
    - (a) Co-planer vector
    - (b) Vector addition
    - (c) Collinear vector
    - (d) Position vector
  5. When density of gas increases, the mean free path of molecules—
    - (a) Increases
    - (b) Decreases
    - (c) Remain same
    - (d) Varies in a complicated manner.
- Questions 6, 7 and 8 refer to the diagram shown below which represents the simple harmonic motions of a particle in a progressive wave with speed  $5 \text{Kms}^{-1}$ .
- 
6. The frequency of the vibration is—
    - (a) 2.5Hz
    - (b) 5 Hz
    - (c) 25 Hz
    - (d) 50 Hz
  7. The amplitude of the vibration is—
    - (a)  $\sqrt{2} \mu u$
    - (b)  $2 \mu m$
    - (c)  $2\sqrt{2} \mu m$
    - (d)  $4 \mu m$
  8. The wavelength is—
    - (a) 5m
    - (b) 100m
    - (c) 15 m
    - (d) 20m
  9. Which one is two dimensional motions?
    - (a) Motion of a fan
    - (b) Motion of a plane
    - (c) Pulling a spring
    - (d) Motion of a spinning top.
  10. Which one is an example of elastic collision?
    - (a) Collision between a box and mud ball.
    - (b) Collision between a truck and a car.
    - (c) Collision between bouncing ball and floor.
    - (d) Collision between two gas molecules
  11. In which point weight acts?
    - (a) Point of weight
    - (b) Centre of gravity
    - (c) Centre of mass
    - (d) Points action
  12. In case of  $g$  —
    - i. Depends on mass
    - ii. Depends on latitude
    - iii. Independent of place

Which one of the following is correct?

    - (a) i
    - (b) i & iii
    - (c) ii & iii
    - (d) i, ii & iii
  13. The mercury bubble is spherical in shape because of—
    - (a) Viscosity
    - (b) Stress
    - (c) Surface energy
    - (d) Surface tension
  14. Cohesive force is between—
    - (a) Similar molecules
    - (b) Dissimilar molecules
    - (c) Magnetic molecules
    - (d) Water and glass molecules
  15. For a particle making S.H.M the phase difference between displacement and velocity is
    - (a) 0
    - (b)  $\pi$
    - (c)  $2\pi$
    - (d)  $\pi/2$
- If  $\vec{A} = 6 \hat{i} - 3 \hat{j}$  and  $\vec{B} = -2 \hat{i} - 6 \hat{j}$  then answer question no 16 & 17.
16. What is the magnitude of  $\vec{A}$  ?
    - (a)  $3\sqrt{5}$
    - (b)  $5\sqrt{3}$
    - (c) 27
    - (d) 4s
  17.  $\vec{A} \cdot \vec{B}$  Will be—
    - (a) 5
    - (b) 6
    - (c) 15
    - (d) 30
  18. What is the right escape velocity of the Earth?
    - (a)  $10.6 \text{Kms}^{-1}$
    - (b)  $11.2 \text{Kms}^{-1}$
    - (c)  $12.6 \text{kms}^{-1}$
    - (d)  $13.6 \text{Kms}^{-1}$
  19. When a particle moves in simple harmonic motion, its velocity leads the displacement by—
    - (a)  $\pi/4 \text{rad}$
    - (b)  $\pi/2 \text{rad}$
    - (c)  $2\pi/5 \text{rad}$
    - (d)  $4\pi/5 \text{rad}$

20. Which of the following quantities is the same for molecules of all gases at a given temperature?

- (a) Mass (b) Momentum  
(c) Volume (d) Kinetic energy

21. The length of a steel wire is 2m. Its area of cross section is  $0.8 \times 10^{-6} \text{m}^2$ . What is the force needed to obtain 0.05mm elongation ( $Y = 2 \times 10^{11} \text{Nm}^{-2}$ )

- (a) 4N (b) 7N  
(c) 8N (d) 9N

22. The engine power of a car of mass  $m$  is  $P$ . What is the minimum time taken for the car to accelerate from rest to a speed of  $V$ ?

- (a)  $P/mv$  (b)  $2P/mv^2$   
(c)  $mv^2/2P$  (d)  $mv^2/4P$

23. An object is dropped from a horizontally flying plane. The object will drop.

- i. Vertically down  
ii. Move on its circle  
iii. Fall on a parabolic path

Which one of the following is correct?

- (a) i & ii (b) iii  
(c) ii & iii (d) ii & iii

24. A car is moving with  $3 \text{ms}^{-2}$  acceleration starting from rest when will it travel 24m distance?

- (a) 4s (b) 4.5s  
(c) 5s (d) 5.5s

25. Which one is an example of uniform velocity?

- (a) The velocity of a freely falling body  
(b) The velocity of a projectile  
(c) Motion of a pendulum.  
(d) Motion of the minute hand of the clock.

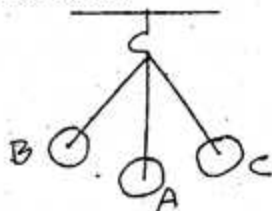
26. For motion of a rocket—

- i. Higher the rocket moves the acceleration decreases.  
ii. The acceleration increases if relative velocity increases.  
iii. If the rate of emission of gas increases the acceleration also increases.

Which one of the following is correct?

- (a) i & ii (b) i & iii  
(c) ii & iii (d) i, ii & iii

Answer the questions no. 27 & 28 observing the diagram given below.



27. The distance AB or AC is called—

- (a) Linear amplitude (b) Angular amplitude  
(c) Circular amplitude (d) Phase

28. At point B or C the effective force is—

- (a)  $mg \cos \theta$  (b)  $-mg \sin \theta$   
(c)  $ma$  (d)  $-w^2x$

29. What is the minimum value of  $\sin^2(\omega t + \delta)$  at maximum potential energy?

- (a) 1 (b) -1  
(c)  $\frac{1}{2}$  (d)  $-\frac{1}{2}$

30. When  $U = \frac{1}{2} KA^2$ , then —

- (a)  $X = \frac{A}{2}$  (b)  $X = A$   
(c)  $X = 2A$  (d)  $X = 0$

31. Acceleration and displacement always have—

- (a) Opposite sign (b) Negative sign  
(c) Positive sign (d) Same sign

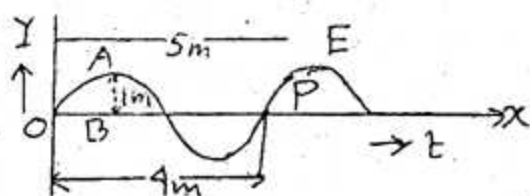
32. The force which takes the particle back is called—

- (a) Restoring force (b) Dynamic force  
(c) Rotational force (d) Net force

33. In simple harmonic motion if time is  $t$  and velocity is  $V$  then which is correct?

- (a)  $V = A \omega \sin(\omega t + \delta)$   
(b)  $V = AV \cos(\omega t + \delta)$   
(c)  $V = A \omega \cos(\omega t + \delta)$   
(d)  $V = A \omega^2 \cos(\omega t + \delta)$

Observing the figure answer questions no 34 and 35.



34. What are called point A, E?

- (a) Trough (b) Amplitude  
(c) Displacement (d) Crest

35. Which one is equation of the wave at point?

- (a)  $Y = \sin \frac{\pi}{2}(vt - 5)$   
(b)  $Y = A \sin 2\pi(vt - x)$   
(c)  $Y = A \sin \frac{2\pi}{\lambda}(vt - x)$   
(d)  $Y = 4 \sin 2\pi(vt - 5)$

1	(a)	2	(c)	3	(a)	4	(c)	5	(b)	6	(d)	7	(b)	8	(b)	9	(a)	10	(d)	11	(b)	12	(c)	13	(d)	14	(c)	15	(d)	16	(a)	17	(b)	18	(b)	19	(b)	20	(d)		
21	(a)	22	(c)	23	(b)	24	(a)	25	(d)	26	(c)	27	(a)	28	(b)	29	(a)	30	(b)	31	(a)	32	(a)	33	(c)	34	(d)	35	(a)												